MLMP Updates

An e-Newsletter of the Monarch Larva Monitoring Project

mlmp.org

Spring 2021

Twenty-five years, and still counting!

The 2021 Monarch Larva Monitoring Project season represents the beginning of a new quarter century for this project. During our first 25 years, a great deal has changed for the better. What hasn't changed is the importance of our work—the value of the contributions we are making to better understand what drives monarch populations and how we can help ensure that they're around in strong numbers for the second 25 years of our collective research.

"New Monarch" photo by Julie Sulfsted

From our very early beginnings of one site in 1996 (monitored by our University of Minnesota Monarch Lab in western Wisconsin) and 17 in 1997, we now have a solid network of volunteers across the monarch breeding range. We've come a long way from the early days of sending and receiving hard copies of data sheets through the mail, and hand entering the data into first Excel and then Access databases. We've developed a website that supports volunteers and provides good information for the public. This website, maintained by the Monarch Joint Venture, can be easily improved to meet our ever-evolving needs. Almost all volunteers enter their own data, and can immediately visualize how their numbers compare to previous years and other sites. If you haven't poked through the data lately, check out your state and others. The project has been nimble enough to respond to new research directions, such as adding a protocol for assessing parasitism rates in 2000 and identifying parasitoids in 2010. Even the COVID-19 pandemic has brought some positive changes, with training webinars that allow us to interact in real time with volunteers.

One big change has been with monarchs themselves. The population has declined over the years of the MLMP, but because we and others are documenting the changing population, monarchs are receiving important conservation attention. While they didn't receive the legal protection that would have resulted from their listing as a threatened species under the Endangered Species Act, people are doing a great deal to help monarchs by restoring and protecting habitat throughout their breeding, migratory, and wintering ranges. And we know from surveys and interviews that MLMP and other butterfly citizen science volunteers are likely to increase their engagement in conservation action as a result of their engagement in monitoring.

We hope that you choose to be part of our new quarter century. If you live in the southern breeding range and have already begun, ***thanks***! Twelve sites are already reporting data from Texas, two from Oklahoma, and two from Florida as the rest of us eagerly await the arrival of milkweed and monarchs. Journey North observers have seen monarchs as far north as Saint Louis and Louisville.

Remember, even if you don't see many monarchs, your data are important. We need to document the low years as well as the high years to understand monarch population dynamics. And unless we have outstanding weather conditions this summer, numbers could be low again. The population of monarchs in the Mexico wintering sites decreased by 26 percent over previous year, from 2.83 hectares in the winter of 2019-2020 to 2.10 hectares in last winter. But this is a resilient species, and no matter what the numbers are, the magic of turning over a milkweed leaf and seeing a tiny egg or caterpillar, or seeing the tell-tale signature of chewed leaves or caterpillar frass never grows old! Here's hoping that you experience this magic in 2021.

~Karen Oberhauser, MLMP Co-founder and UW-Madison Arboretum Director

MLMP Updates

Introducing Julia Whidden

Julia Whidden

Hello, dear MLMP Citizen Scientists!

I'm Julia, the new Citizen Science Coordinator at UW-Madison's Arboretum and the MLMP. While I hope to be able to meet some of you in-person one day, a virtual introduction will have to suffice for now.

I hail from Niagara Falls, Canada, and made my way to Wisconsin in the fall of 2019. I studied biology for my undergraduate degree, and earned my Masters in marine conservation from Acadia University in Nova Scotia, studying at-risk populations of skates (a group of fish closely related to rays). Thanks to a Fulbright Canada scholarship, I then traveled south to Miami to spend a year studying coastal sharks. I dove headfirst into community outreach and citizen science, and a few years later found myself translating those experiences in the challenging but rewarding world of non-profits. Now, I write to you from my home office in Madison, eager to take all of my experiences and apply them to a brand new environment and brand new field of biology!

It's a true honor to take over the role of coordinating the MLMP. The project's impact, reach, and longevity are a testament to the devotion of our volunteers and the vision of our leaders. Having attended my first virtual training session a few weekends ago, I was inspired by our new participants' passion for monarchs and their varied paths into monarch conservation. Monarch butterflies are undoubtedly an incredible species, and I've found myself excitedly texting friends and family with every new and astonishing fact I learn about them.

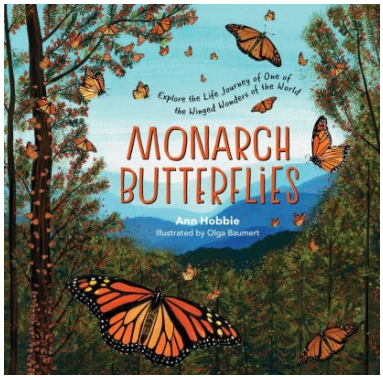
Since I began this position in early February, I've been busy learning the lay of the land. From taking over our social media accounts, to learning behind-the-scenes website management, to studying MLMP activities and methodologies, I've been immersing myself in monarchs. I'm also the new person behind the info@mlmp.org email and this newsletter. Please continue to reach out to us with any questions, comments, or concerns you may have as we enter another season of monitoring. Though I may not yet have all of the answers to your questions, I know the people who do! I hope you enjoy reading this newsletter, and that we'll get to meet one day in whatever the "new normal" looks like.

Wishing everyone a happy and healthy spring,
Julia

Virtual MLMP Trainings

On March 27th, MJV and MLMP hosted our first virtual training of the year. The training was attended by 96 participants from across North America, and was a great success! Our next virtual training session will be on Saturday, June 12th, and registration can be accessed here. You can also follow MLMP on social media to stay up-to-date with program events and announcements.

MJV Board Chair Publishes Children's Book about Monarchs



Monarch Joint Venture's Board Chair Ann Hobbie recently published a book titled "Monarch Butterflies: Explore the Life Journey of One of the Winged Wonders of the World." For readers aged 7—10, her book teaches children about the monarch life cycle, anatomy, migration, rearing, cultural significance, and how to create habitat, become citizen scientists, and support butterfly conservation organizations. Ann is a former elementary school teacher who helped Dr. Oberhauser develop the original Monarchs in the Classroom curriculum and spent many years developing schoolyard ecology curricula. Her book can be purchased online and at most major book retailers.

25th Anniversary of MLMP Data Being Collected in Wisconsin this Summer

This year, Pollinator Week will take place on June 21st – 27th, a celebration that will overlap with the 25th anniversary of MLMP data being collected in Wisconsin for the first time. "Site with ID 57" in Erin Prairie, western Wisconsin, was first surveyed by Dr. Karen Oberhauser and her lab in late June of 1996 when she reported 3 monarch eggs. Over 10 weeks, she observed 9,038 common milkweed plants on the rural agricultural land, with peak egg density in the first week of August. We'll be sharing more about this exciting anniversary leading up to Pollinator Week, but wanted to highlight it now as we enter another season of monitoring. Check out the data from this first season in Figure 2 below.

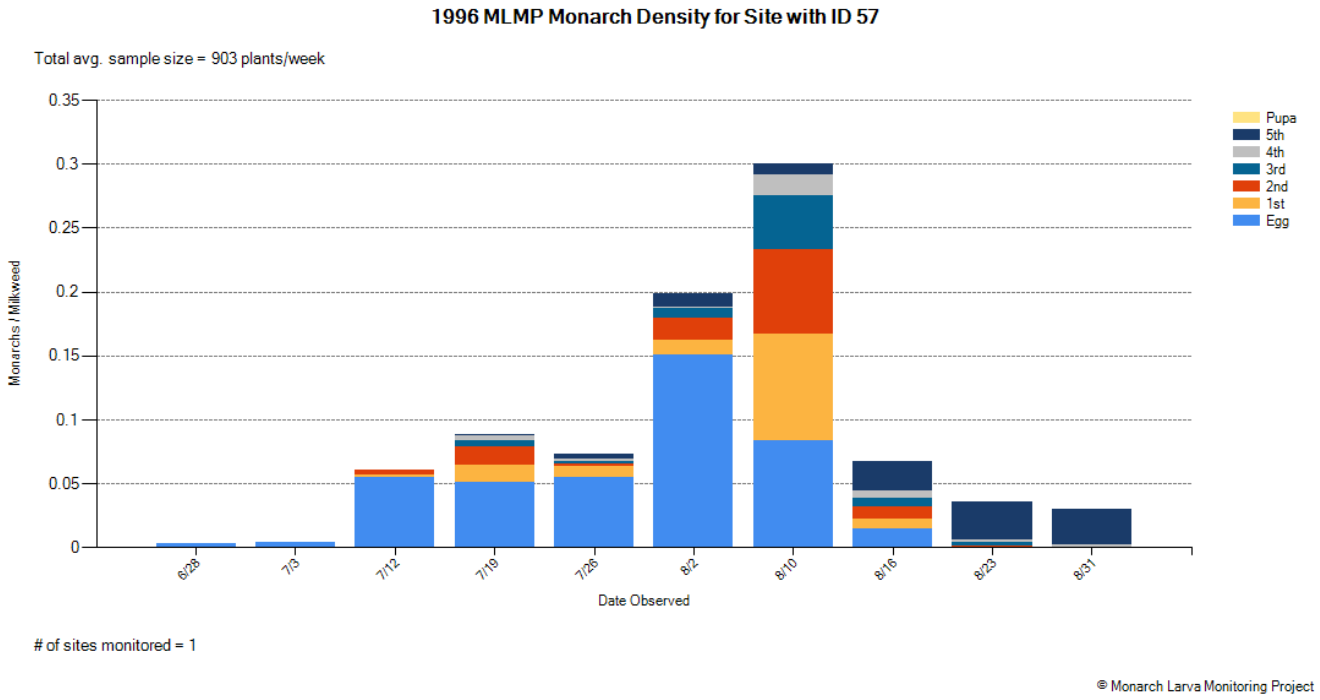


Figure 2. Data from "Site with ID 57" in 1996, the first MLMP site monitored in Wisconsin.

Site Spotlight: "Katie" in North Central Pennsylvania

In North Central Pennsylvania, seasoned citizen scientist Henry Berkowitz sits on 35 acres of southern exposed mountainside. Henry and his wife Linda first bought the property in 1978, before which it was used to pasture sheep. A year later, he began the ambitious project of planting 5,000 trees on it, most of which were conifers the size of toothpicks that would eventually flourish and encroach on his home. The trees he planted are one of many things to flourish on Henry's land, including diverse milkweed, monarchs, and most significantly, his daughter Katie.

Henry Berkowitz's mountainside property

Henry's younger daughter Katie was diagnosed with Leukemia in 2003. Since they lived in a rural community 2 hours from the nearest hospital, as she began chemotherapy treatments her doctors suggested she remain at the hospital instead of returning home in between. This time for Katie was full of suffering and loneliness, and it was only after a few months that she was finally permitted to head home on the weekends. On her first trip home, one of the things she wanted to do was take a walk up their mountainside. During their walk, Henry and Katie kept noticing caterpillars everywhere, and once back down at their house, they discovered through a quick internet search that they were monarchs. They continued their reading, and the next day Katie had to return to the hospital. For the next few months, every day they visited her she would ask about how her (con't…)

… monarchs were doing. It quickly became apparent to Henry that the monarchs were a great distraction for Katie, giving her something else to focus on other than her own discomfort. In late July of that year, on one of her next visits home, they took a walk through their field and counted hundreds of monarch caterpillars.

Henry's daughter Katie

Five years later, they received the news they'd been eagerly awaiting – Katie had officially been cured of her cancer. It was cause for celebration, and Henry asked Katie where in the world she wanted to travel to mark the momentous occasion. She chose El Rosario Sanctuary in Mexico, wanting to see where the monarchs overwinter. In January 2017, they hopped on a plane with a big group of friends and traveled south. Henry described seeing the monarchs there as awe-inspiring and noted that there were so many, they could hear their wings flap. At this point, Henry had already become a seasoned citizen scientist, having contributed to a variety of monarch conservation projects, including the MLMP, monarch tagging with Monarch Watch, and Oe parasitoid sampling for Project Monarch Health. The initial catalyst for his participation in monarch community science was his daughter Katie, of course. Recognizing how significant a role monarchs played in helping distract his daughter during an incredibly difficult time, it became important to him to give back to monarchs in whatever way possible. At first, giving back meant doing nothing — in the sense that he left his field alone and let the existing milkweed flourish. He watched it grow year after year, and in 2007 began tagging monarchs for Monarch Watch. In 2009, he joined us at the MLMP. Henry has 3 sites in his field of about 5 acres, with additional patches of nearly 4 acres of milkweed growing elsewhere on his property. From his 3 sites named "Katie," Henry has monitored 2973 milkweed plants since 2009. While he now finds fewer caterpillars in the sites that used to be overflowing, his passion for their conservation remains. In 2018, his family planted 3 more acres of pollinator habitat including native wildflowers and shrubs with the help of the Natural Resource Conservation Service. Henry is a model advocate for monarch conservation, and we thank him for sharing his story with us and collecting valuable data over the past 12 years.

Henry Berkowitz in his site "Katie", named after his daughter

Henry and his wife Linda still live on their southern exposed mountainside in North Central Pennsylvania, while Katie is now a Registered Dietician in New Mexico.

Monarch Research Review by the Monarch Joint Venture

The Monarch Joint Venture and partners compiled a summary of new research on monarchs and milkweed published between June 2019 to August 2020. This research includes peer-reviewed journal articles, doctoral dissertations, and one non-peer-reviewed journal article, totaling 67 papers. Research topics span habitat quality and conservation, monarch populations and biology, goal setting, and community involvement in monarch conservation. While their whole summary can be found on MJV's website here, we've picked out a few particularly interesting points to share with you.

Policy & Collaboration

- Collaboration between federal and local governmental agencies, NGOs, and academia, an increased social awareness for monarch conservation, and landowner incentives on habitat protection and restoration have contributed toward successfully curbing illegal logging in the Monarch Butterfly Biosphere Reserve (Flores-Martínez et al., 2020).

Migration & Movement

- Fall migration success of eastern monarchs was correlated with the level of greenness of the southern U.S (Taylor et al., 2020).
- Monarchs tagged on the same day in SE Arizona flew in different directions; some flew to California and while others traveled to Mexico. However, data suggest that monarchs captured earlier in the season (early/mid-September) are more likely to be recovered in California, while later-season monarchs are more likely to be recovered in Mexico. This is further evidence that the eastern and western monarch populations interact (Billings, 2020).

Captive Rearing

- Rearing commercial monarchs or those caught in the wild indoors (even with access to natural sunlight) may interfere with their ability to properly orient south, which may have implications for successful fall migration (Tenger-Trolander and Kronforst, 2020).

Urban Gardens and Landscapes

- Monarch eggs and larvae were more abundant in gardens with milkweed planted around the perimeter compared with those where milkweed was surrounded or intermixed with other nectar plants and grasses (Baker and Potter, 2020).

Threats

- Monarchs appear to adaptively shift their oviposition and foraging strategies to avoid heavily-contaminated host plants. Adult monarchs laid fewer eggs on milkweeds containing high levels of pesticides (the maximum concentrations present in agricultural fields) and first instar larvae showed preference for pesticide-free milkweed in lab trials (Olayas-Arenas et al., 2020).

Climate Change

- Climate change, and in particular warming spring temperatures, will likely have a negative effect on the eastern population of monarch butterflies (Crewe et al., 2020).
- Climate is currently the major driver of forest loss and is expected to continue to have future impacts on overwintering habitat degradation as climate change progresses. Forest cover losses from climate-related events (wind and rainstorms) have increased since 2012 at the Monarch Butterfly Biosphere Reserve (Flores-Martínez et al., 2019).
- Researchers used modeling based on climate change and reports by the National Commission on Protected Areas of Mexico to locate two new colonies of overwintering monarchs in the Sierra Nevada, both in mature oyamel fir forests. This could signify that monarchs are already seeking out new overwintering grounds and could impact how overwintering habitat is prioritized for conservation in the face of climate change (Perez-Miranda et al., 2020).

Habitat Loss and Degradation

- An estimated 20% of forest loss in Michoacán is associated with the expansion of avocado orchards. This includes areas of global significance for the conservation of biodiversity, i.e., Key Biological Areas per the International Union for Conservation of Nature (IUCN) criteria. The author recommends using existing data on the farm-level origin of avocados to increase supply chain transparency and give consumers the ability to reward sustainable avocado production, ultimately reducing the impacts of avocado production on Michoacán forest loss (Cho, 2020).

An avocado orchard

Predators and Parasites

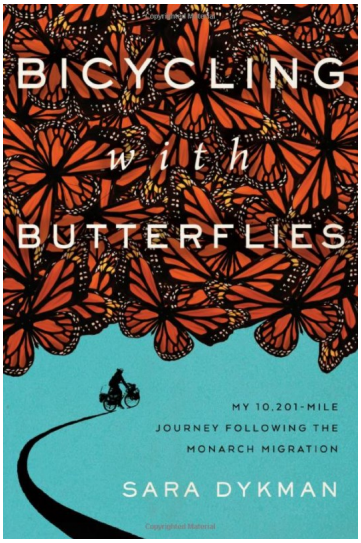
- Monarch larvae suffer significant predation by the invasive paper wasp, *Polistes dominula,* in urban gardens. *Polistes* wasps were observed in a majority of the urban gardens studied in Kentucky and monarch larvae in urban settings sustained significantly more predation by *Polistes* wasps than monarch larvae in rural settings (Baker and Potter, 2020).

Research Summary Citations

- Baker, A., and Potter, D. A. (2020). Invasive paper wasp turns urbans pollinator gardens into ecological traps for monarch butterfly larvae. *Scientific Reports* 10: 9553. doi: 10.1038/s41598-020-66621-6.
- Billings, J. (2020). Opening a window on Southwestern monarchs: fall migrant monarch butterflies, Danaus plexippus (L.), tagged synchronously in Southeastern Arizona migrate to overwintering regions in either Southern California or Central Mexico. *The Journal of the Lepidopterists' Society*, 73(4), pp.257-267.
- Cho, K. (2020). Environmental impacts of the U.S.-Mexico avocado supply chain (Master's thesis, 2020). Ann Arbor, Michigan.
- Crewe, T. L., Mitchell, G. W., and Larrivée, M. (2019). Size of the Canadian breeding population of monarch butterflies is driven by factors acting during spring migration and recolonization. *Front. Ecol. Evol.* 7:308. doi: 10.3389/fevo.2019.00308
- Flores-Martínez, J. J., Rendón-Salinas, E., Martínez-Pacheco, A., Salinas-Galicia, R., Munguía-Carrara, M., Rickards, J., Sarkar, S., and Sánchez-Cordero, V. (2020). Policy Implementation Halts Deforestation in Winter Habitat of Monarch Butterflies in Mexico. *BioScience* 70(6), 449–451. https://doi.org/10.1093/biosci/biaa038
- Olaya-Arenas, P., Scharf, M. E., and Kaplan, I. (2020). Do pollinators prefer pesticide-free plants? An experimental test with monarchs and milkweeds. *J. Apple. Ecol.* 00, 1-12. doi:10.1111/1365-2664.13711
- Perez-Miranda, R., Arriola-Padilla, V. J., and Romero-Sanchez, M. (2020). Characterizing new wintering sites for monarch butterfly colonies in Sierra Nevada, Mexico. *Insects* 11:384. doi:10.3390/insects11060384
- Taylor Jr, O. R., Pleasants, J. M., Grundel, R., Pecoraro, S. D., Lovett, J. P., & Ryan, A. (2020). Evaluating the Migration Mortality Hypothesis Using Monarch Tagging Data. *Front. Ecol. Evol.*, 8, 264. doi: 10.3389/fevo.2020.00264
- Tenger-Trolander, A., Kronforst, M.R. (2020). Migration behaviour of commercial monarchs reared outdoors and wild-derived monarchs reared indoors. *Proc. R. Soc. B.* 287: 20201326. http://dx.doi.org/10.1098/rspb.2020.1326

Monarchs in the Media

Cyclist Writes Book About her Journey Following the Monarch Migration



Head to your nearest book retailer or shop online for this new non-fiction book about the monarch migration by author Sara Dykman.

About the book:

"Outdoor educator and field researcher Sara Dykman made history when she became the first person to bicycle along-side monarch butterflies on their storied annual migration—a round-trip adventure that included three countries and more than 10,000 miles. Equally remarkable, she did it solo, on a bike cobbled together from used parts. Her panniers were recycled buckets.

In *Bicycling with Butterflies*, Dykman recounts her incredible journey and the dramatic ups and downs of the nearly nine-month odyssey. We're beside her as she nav-igates unmapped roads in foreign countries, checks roadside milkweed for monarch eggs, and shares her passion with eager schoolchil-dren, skeptical bar patrons, and unimpressed border officials. We also meet some of the ardent monarch stewards who supported her efforts, from citizen scientists and research-ers to farmers and high-rise city dwellers.

With both humor and humility, Dykman offers a compelling story, confirming the urgency of saving the threatened monarch migration—and the other threatened systems of nature that affect the survival of us all."

You can support MLMP in many ways!

Please consider supporting our collective conservation efforts with a donation that supports training, materials, and maintenance of the data you collect. You can make a financial contribution today here.

Have a story from your site or art to share? We'd love to hear from you!

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